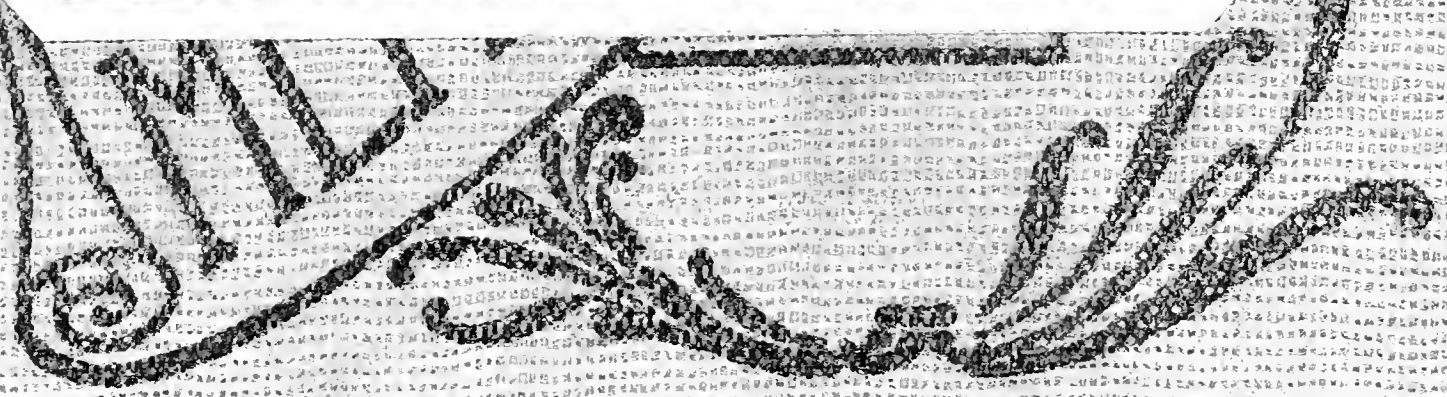
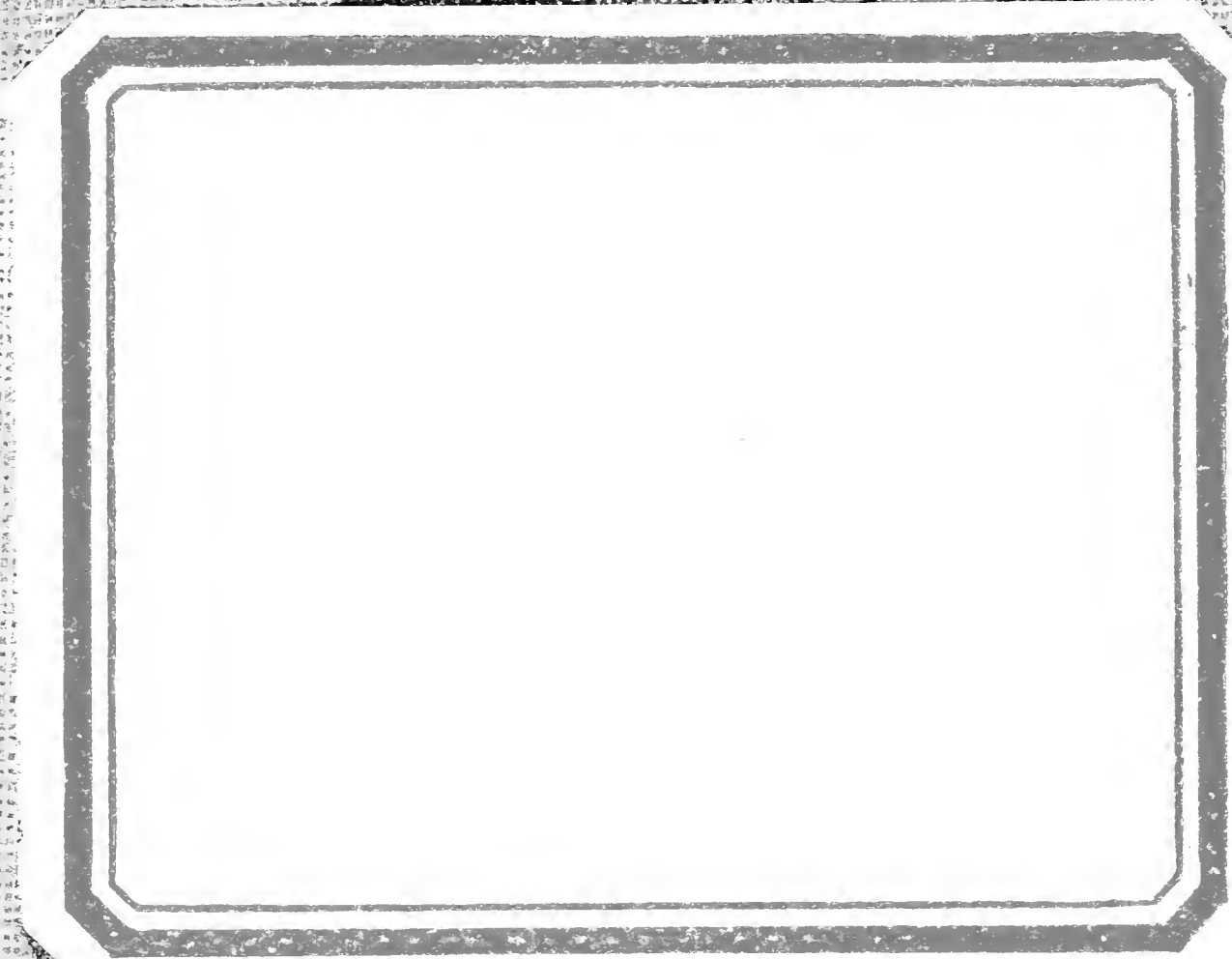


SIoux FALLS, 1906



P. O. Box
 Sioux City
 Iowa

Foster House
 Vandeventer

Blair -	8.21 P.M.
De Soto	8.31 P.M.
Calhoun	8.38 P.M.
Coffman	8.45 P.M.
Flournoy	8.55 P.M.
Omaha	9.10 P.M.

Sioux Falls Locations

1. A mile N.E. of P.O. along Ill. Cent. RR.
2. N. & W. of burning.

Granellon Loc.

1. From Calhoun to 2 mi. N. Locs on Sioux Q.
2. Just E. of town - Reddish granite - slight
3. In RR cut - on Sioux City branch.

Arroyo Falls, S. Dak

Aug. 15, 1906.

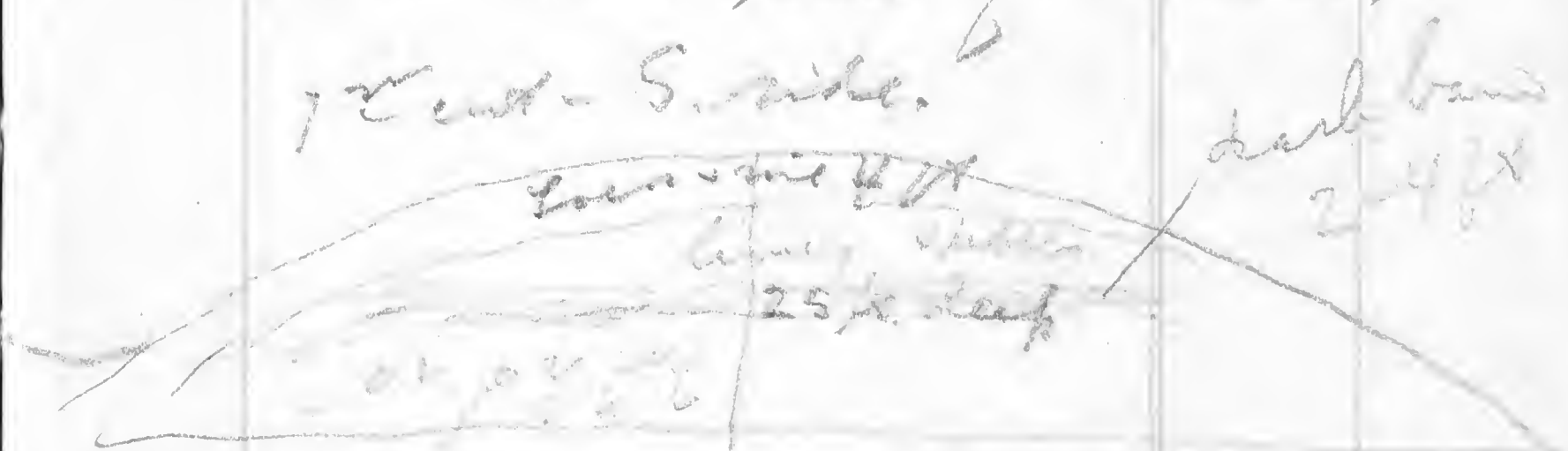
Went out N.E. along
Ill. cont. P.M. to series
of cuts about a mile N.E.
of Ill. cont. deposit.

1st cut -

This is about 25 ft
deep & at the top
shows a loam-like layer
4 ft. deep (including soil
which is light). It
is a little heavier than
ordinary loam, but
appears to be it.

At a height of about
14 ft. there is a horizontal
band 2 to 4 ft. deep, of
a fine gravelly soil
with much iron &
dark shales.
Above it is fine yellow

pebbly clay with lime &
below it (lower 1/2 of cut)
coarse gravel & boulders,
Wisconsin stuff.
See samples of loam.
1st cut - S. side.

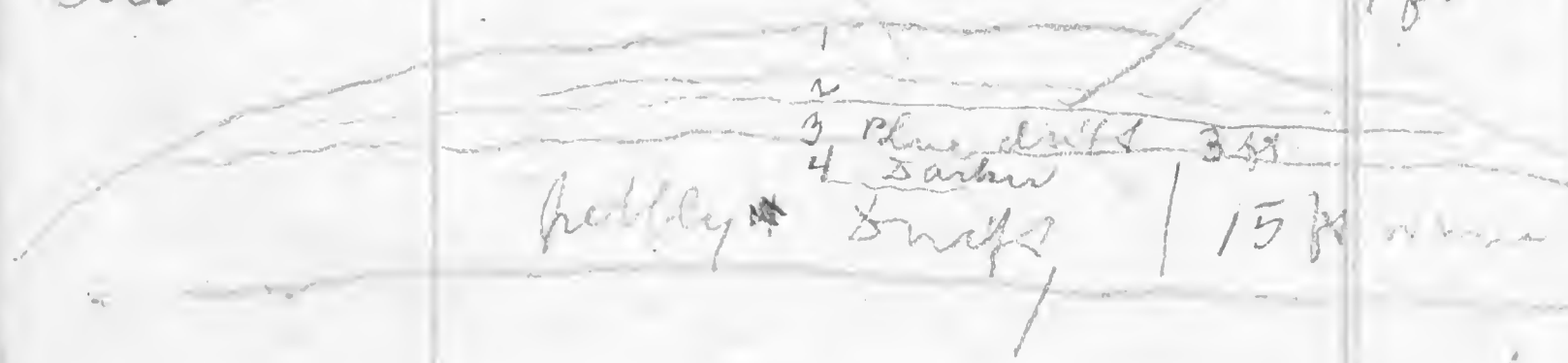


cut about 300 ft. long
boulders, etc.
The North side's similar
2nd cut, - really a continuation
of cut 1 - is about as
deep, but perhaps
three as long.
It has over 5 ft of yellow
loam on top, with streaks of
fine sand.
Then a slightly pebbly
yellow layer, transition

gradual, which is still like loam, bearing pebbles which are not numerous. Then follows a nearly horizontal layer of bluish clay with a few pebbles & some irregular small nodules, the change to this being quite abrupt, but no oxidized layer. This bluish stuff is about 3 ft. deep.

Then follows gravelly drift, with fewer large red boulders than occurs in No. 1.

Cut 2 - Wide' 5 ft. few pebbles 1 ft.



Could not see face, as this is covered with talus.

The blue layer no. 3 - seems to correspond to the dark rusty layer in cut 1. No. 3 seems to be about 3 ft. deep & then comes a darker mass of clay with mostly small pebbles - extending nearly to base of cut which is obscured by talus. (See sample)

Cut 3 - Back of this (S.) a man has a 6-ft. pit, & this shows following - extending away below

6 ft. dark layer of cut 2. Blue loam like clay, but heavy, & with occasional pebbles. Also a few very large iron tubules, - nearly vertical.

This layer is 2-4 ft. deep.

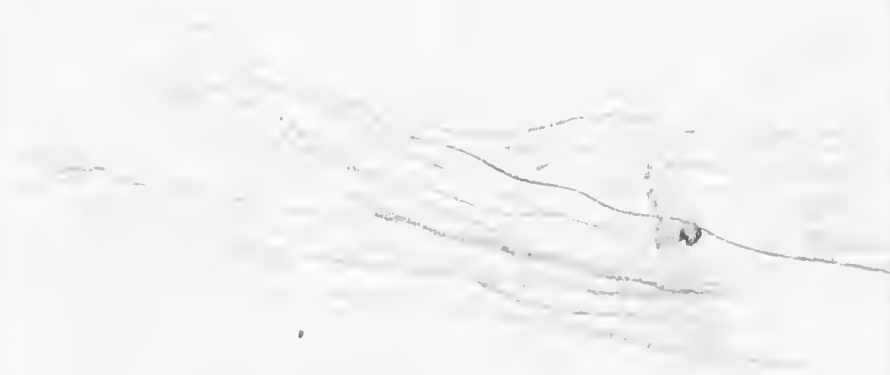
Then follows interbedded sand, with gravel. new for building.

cut 3, b.

1 dark = no. 4 of cut 2

2 Lenses like, with pebbles 2-4 ft.

3 stratified & interbedded sand & gravels.



Cut 3-a - along RR

Shows some part of yellow clay stone, with pebbles in lower part, & then the bluish layer = no. 1 in cut 3 b.

There are a good many pebbles in upper part of this. This is again nearly horizontal.



Profile looking S (E. of). Cuts 1 & 2 pass through body of double ridge.

Dan says he has found teeth & bones in the sand below. Also bones in the dark clay.

The big cut on the new Dakota Central (bank of Ill. Cent.) near the

penitentiary is all a yellow drift clay with small pebbles, excepting the upper 3 or 4 ft which appears loamy, but more like joint clay in lower part. The upper part of drift has a rather distinct oxidized band. The cuts at the quarry are badly slumped, and nothing could be done without further excavation.

Moraine's hill extends down the river on the north side as far as I could see, & across to south.

The Big Sioux here runs over numerous ledges & boulders of Sioux Quartzite, the water being very swift on these rapids, or in quiet pools between rapids. There are no large bars of sand or mud.

Rock river at Luverne is similar, except that no great ledges of Sioux Q. appear. It shows the quiet pools, with water below each running over beds of coarse gravel, no great bars of sand or mud.

Our prairie streams as they appeared in the

Wisconsin area in Iowa there were no bars, as the streams were chiefly straight, with the edges & borders densely covered with vegetation.

Much of loess material not carried far by wind. Glaciers and streams brought it near & then winds distributed it.

Evidence:

- 1- Material is like that which waters are constantly washing out of exposed drift ^{segregation of boulders}.
- 2 Distribution along broad-valleyed streams,

with large bars at low water, cases:

Missouri
Mississippi
Platte -
Iowa.

(How about Cedar?)

Illinois
Iowa
Ohio -

- 3- Finer material far from streams, coarser near.
- 4- Special localities in which wind action is manifest:

Riverside, near Sioux Cy.
Madison, Ind.
New Harmony, Ind.
Wheat Pt., Neb.
Hooper, Neb.
St. Joseph, Mo.

- 5 - Gravel such as found
in timber, etc. along
streams.

Beaver Creek, Maine

Aug. 15, 1906.

The cut just east of
depot shows yellow
loamy stuff like
that in cuts 1 & 2
at Lawrence, which
has some nodules & a
few pebbles below.

It seems to get sandier
downward.

I went west $1\frac{1}{2}$ miles &
saw two cuts beyond.

At $1\frac{1}{2}$ mi. there is one
and at 1 mi. another.
Like all these cuts,
long & deep, about 5-8 ft,
cutting broad low ridges.

Another begins at
 $\frac{1}{2}$ mi. from depot &
runs over 500 ft. W.

The structure is remarkably

uniform in all these.

There is an uppermost loamy, brownish layer, 2 or 3 ft., then yellow clay which shades down into what in many cases is loose sand.

There are minute pebbles occasionally in this clayey part, scarcely more than grains of sand.

Even if all this day were glacial, it has still no doubt been worked over by various agencies & brought to the surface.

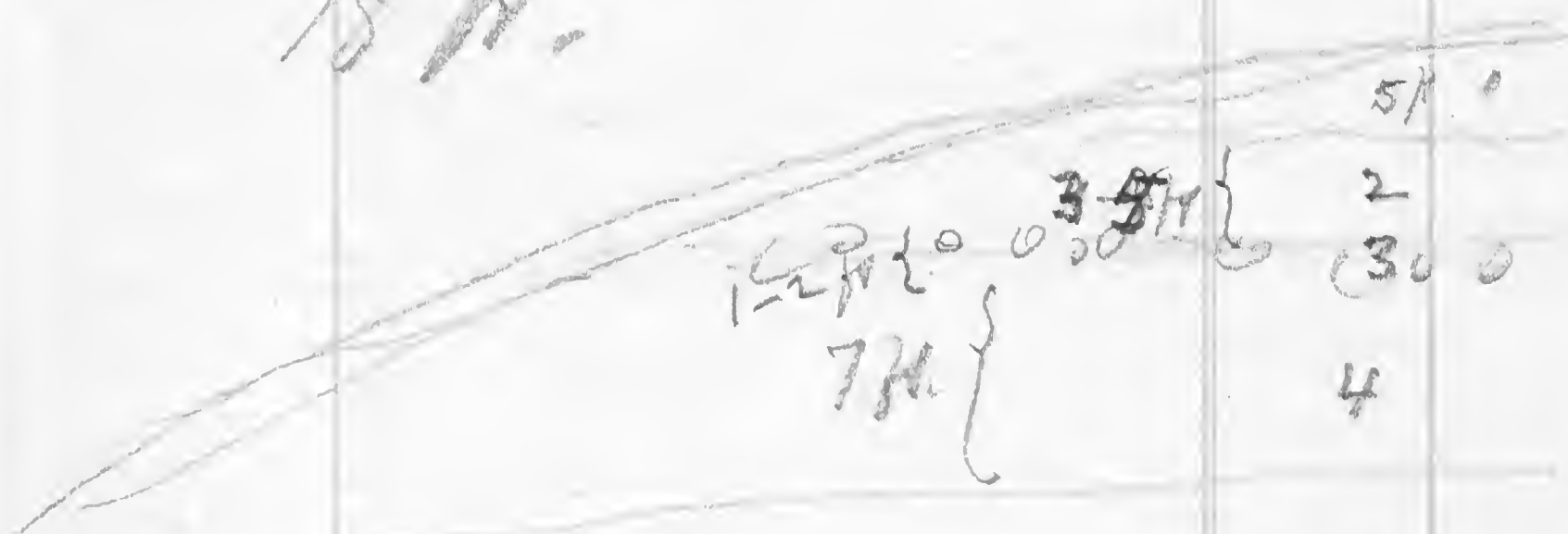
The cut beginning at 1/2 mile cut is usually remarkably free from pebbles. Some small lime nodules appear. Another cut 1/3 of a mile cut shows more sand & in lower part iron streaks (see sample).

These cuts all look remarkably like cut 3. E. of Lawrence.

A small stream between Valley Forge & Brandon shows quiet pools and bouldery rapids.

Went back to cut 3 a
along Ill. Cent. N.E.
of Sioux Falls.

On N. side the
whole cut is about
15 ft.



- 1- is fine sand - slightly
small irregular lime
- 2- a loess with laminations
few nodules
- 3- gravelly boulders - a
gravel has spread
a little gravel appears
digging farther to
in the deposit 2.
- 4- a bluish loess-like
but occasionally having
pebbles - see samples.



clayey. Contains numerous
nodules.
black spots, iron streaks & all,
horizontal band from which
down over 4.
on surface at 3, but repeated
bring any gravel to view.
interior, with laminations,
coarse sand grains & small
pebbles.

Cut 2 N. side (lowland)
is similar to 3a,
1 - 5 ft. + redder brown
top.

2 - about 4 ft. Black
loam.

3 - Gravely loam in
clay 1 ft.

4 - About 12 ft. &
here containing coarse
sand grains & minute
pebbles & in lower
part becoming decidedly
like joint clay.
The lines are not
sharp excepting
between 3 & 4 it
merges both
ways.

3-4 is especially
clear.

In cut dr - nos
1 & 2 appear, but
2 may have minute
pebbles (see notes p
20) & the red
oxide layer below
with it, which extends
lower, is thicker &
has larger boulders
than in 3 & 2.

Garrettsville, S. Dak

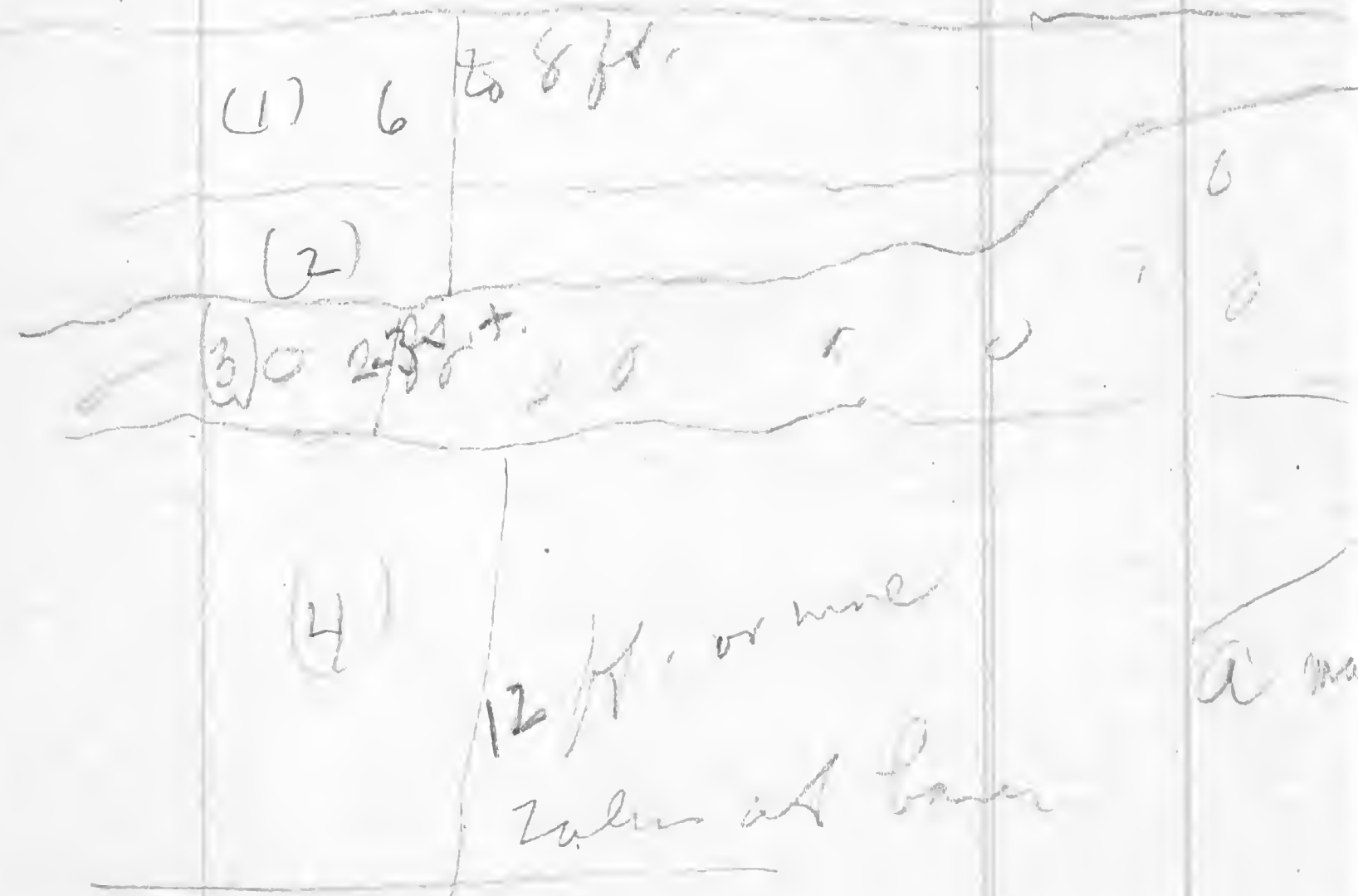
Aug. 16-1906

Went out S.E. along
Sioux City line of
Gr. Northern.

The first cut, across
a gravelly ridge, which
rises in irregular knobs

further N., is just a
mile out from the depot.

On E. side it shows
following:



no 1- Is brownish soil & loamy
stuff & becomes more
firm below & blends with
no. 2, which is more

no 2 compact, & contains
occasional pebbles.

This is brownish yellow -

A few fine nodules.

no. 3 - Irregularly bedded layers
of sand & gravel. Some
& used by R.R. for ballast

no. 4. Yellow drift clay with
some pebbles & many fine nodules.



fine stratified sand.

The W. side of cut shows
similar layers, but
irregular. Its base is partly

The boulders in no. 3 are nearly all red.

A small cut beyond,
before wagon road is
reached, shows red
conglomerate, & in drift.
A larger cut beyond
wagon road shows
drift & uppermost
loam with some thin
nodules.

I went N. on this
wagon road, & near
top of ridge 2. of
pointed knobs I
found in a low
cut in road, a
light yellow loam
exposed. It has
numerous small
lime nodules & like
upland surface loams
all over the road.
A few pebbles appeared

below, 4 or 5 ft. down,
& the material is more
compact & more drab.
A little farther down
the slope to N. drift
(red) appears where
surface. Some
grooved boulders
but loam extends
pretty well down
to end of cut.

The country about
Garrettsville is much
broken, like exaggerated
Kansas, with some
larger knobs, as 5.
In the lower places
silt, & is exposed
Split Rock river flows
by. It is in places
shaly, both ledges

and gravel & boulder
bars, and also
has 'quiet pools,
with certain pond-like
& other aquatic
plants along the
edges.

Back to Sioux Falls

Aug. 16, 1956

Cut 5 along Ill. Cent.

N.R. of Sioux Falls,

is just beyond
the N.R.S. wagon road.

It is rather low & quite
long, & has characteristic
boulder bands about
at its base.

Above this is yellow
stuff, with much fine
sand & often numerous
small & irregular
pebbles.

Cut 6 is along the above
mentioned wagon road,
between cuts 4 & 5 on
R.R. 6a is part 5, of
R.R. & 6b north.
6a is all yellow
topmost sandy (fine) stuff.

7

Cut ~~6b~~ - shows 5 or 6 ft.

of this same stuff
above & then run
the almost horizontal
band of boulders &

gravel, as before

On E. side of road it
contains one large

angular block of
red granite (light)

Below the gravel
band (which is slightly
variable in thickness,

but mostly only ~~1-2~~

1-3 ft.) there is

yellow drift clay
with small pebbles.

This cut is remarkably
like the Garretson cut.

The uppermost layer (sandy)
here as at Garretson,

and in other cuts, where
weathered shows horizontal
lamination.

Cut 8 is N. on same wagon
road, across a deep
valley N. of cut ~~6b~~ 7.

It shows much drift &
fine yellow sandy
stuff above, but the
lines are not distinct.

In road cut end 6b a
lot red oxidized gravelly
stuff, with black masses,
in thin bands.

A deep narrow ravine
separates 6b & 7.

6b, shows little bands
oxidized stuff. The latter
seems to be boulder bands.
(See also cut 1.)

28

cut 4 is really a continuation of 6th along R.R. but doesn't show so much oxidized stuff. There is usual brown layer above (loam?), then the sandy layer, the two 5-7 ft deep. Then the bouldery band & finally yellow drift clay with pebbles. The bouldery band is again nearly horizontal.

4. *Agave* *cent.* 4.

A hand-drawn sketch map on lined paper, oriented vertically. A central line represents a road or path, starting from a point at the top labeled '5'. To the left of this point is a small circle with the number '8' inside. Below '5', the path continues down, with '66' and '69' written on either side. Further down, '4' is written on the left, and '1,500 yds.' is written across the path. Below this, a small rectangle is drawn, with '1 mile to Simon' written to its left. Further down the path, '250' is written on the left, and '3' is written below it. A small, dark, irregular shape is drawn on the path, with 'Sand pit' written to its right. Below the sand pit, '250 yds' is written on the left. The path continues down, with '400 yds' written on the left. At the bottom of the path, there is a small, dark, irregular shape, with 'cut' written below it. To the right of the path, there are several wavy lines and the word 'wagon' written at the top right. The number '29' is written at the top right, and 'S' is written below it. The path ends at a point at the bottom, with '1111' written below it.

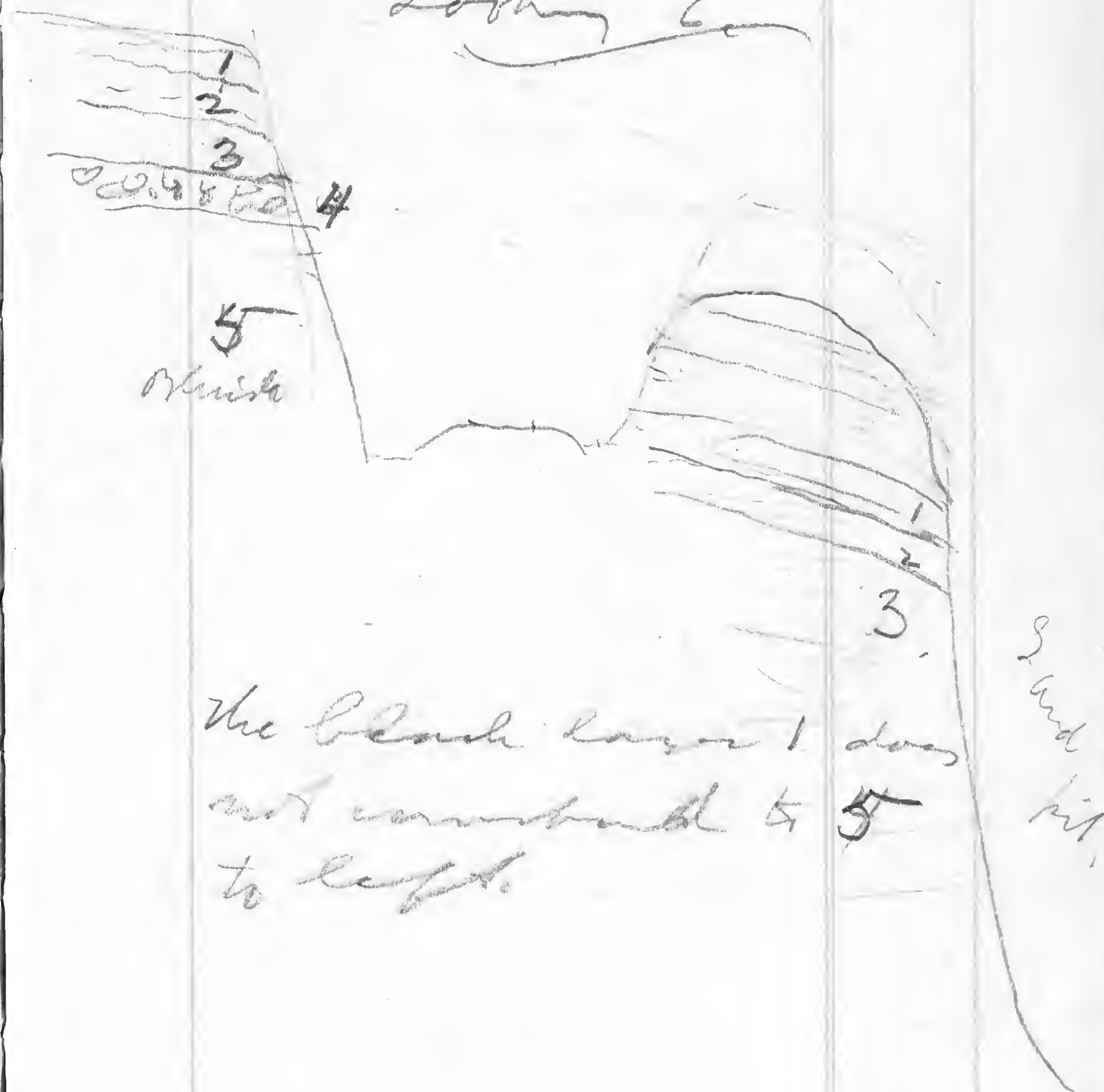
A small cut in
N. side R.R. just W. of
"One-mile" post also
shows gravelly layer
✓ yellow stuff above.

Sand pit back of cut 3.

- (1) 4-6 ft. Dark ^{clay} with
small pebbles,
(2) joint clay, bluish yellow, almost
no pebbles
2-4 ft.
(3) stratified sand
etc.

No 2 is strongly oxidized
above, - appearing like
loess surface.

cut 3
Looking E



The black layer 1 does
not correspond to 5
to left.

I re-examine the materials
in 1, 2, 3 & 5 carefully &
find:

1- Is quite compact clay, yellow
(dark from humus) & seemingly
young loess. about 2 ft.

Shades below into:

no. 2 - which is a layer of yellow, rather loose very fine somewhat cohering sand.

no. 4 - Gravel bed. Lines between no 3 & 4) + (4 & 5) are quite sharp.

no. 3 - A layer of yellow loess, containing dark spots, showing lamination in fractures, & with blue tubes in the yellow loess somewhat like those in Gaulton's brickyard at Iowa City.

no. 5 - Is a Kansan loess: shows lamination in fractures, iron tubules, (vertical or nearly so), & with characteristic Kansan blue-loess color.

The line between this &

at 100 ft

no. 4 is very sharp.

I reached carefully in no. 4, tapping bank at various points, but same result.

Took sample of no. 1 1 ft. from top. There is almost no soil here.

This cut showing 1, 2, 3, 4, 5 was made at the highest point of cut, & hence of ridge.

no. 1 & 2 much more sandy than 3, & there is a little bench - formed by 3



The pebbles & boulders from 4 wash out & spread all over 5 on surface

No. 5. becomes muchy
(blue joint clay) within
about 2 ft. (or more
towards W. end) of
the bottom of cut.
The pebbles are
small. I saw
some dark gravelly
layers on S. side of
cut, & it is
no. 1 of the sand-
pit.

No. 1, 2 & 3 become
thinner westward
(also eastward) &
4 & 5 are almost
horizontal.

The small irregular
lime nodules all
over surface come
from the lower part
of 2, & from 3,

where they are scattered.

Cut no 2 - Extends
lower than 3, as RR
drops.

1 & 2 are distinct

3 grades below into
a narrow band of
yellow muchy joint
clay with a few very
small pebbles.

4 is least distinct
in this cut.

5 is thick & with
the possible exception
of a little on the
S. side, it has no
loess, being nearly
blue joint clay, with
small pebbles.
You can tell the

difference in texture
at once when
digging.

The sandy upper part (2)
+ pockets of sand below
in drift would
indicate there ~~may~~
have been much
more sand exposed
than now, for more
of loess.

The river must have
cut out & carried
away much.

Nodules (small grey)
are very plentiful on
nos. 2 & 3.

Cut 1 - S. side of all. cut - River Valley



Brown red oxidized layer

No. 1, 2, 3
Mudstone, some yellow & brown
but many fossils

In the vicinity of XX

The bottom yellow

all shows

clearly.

Some of these may have
come from water level?

No 3, where developed,
shows a tendency to
become more compact
& with blue streaks
below, in characteristic
loose fashion.

The very much oxidized
layer in cut 1 seems
to run about on
a level with No 4
in cut 2 etc.
It is probably that

Spent the night at the
Teton Sioux Falls.
Hot, hot, hot!

1906 40

Aug. 17 - Friday

Left on the Gr Northern
at 7⁴⁰ AM. for Yankton
Cuts some miles and
show fine light
gravelly drift to
top. Is it all
gravel, or some
overwash?

For a few miles the
country is rather rough,
& then becomes a flatter
plain.

The small cuts on
this plain show
gravel below & a
soil 1 or 2 ft. deep
which becomes yellow
below.

Between Davis & Viborg
a few swamps & pools
appeared.

Beyond Viborg ponds
& swamps are also
frequent. Two
showed mushroom houses.
The vicinity of here
is swampy &
somewhat more
rolling.

Beyond Irene the
hills are higher,
rounder, & with a
few ^{water} large boulders
on surface.

Looks rather morainic.
Some distance beyond
Irene we enter a
valley with slopes
showing *Trimycterus*
(burrows, etc.)
Only show drift
rock ledges also
show.

Valm is right at
the foot of the Mission
bluffs, - here low &
rounded.

The R.R. then runs
across a broad
alluvial plain, with
the low hills far
to the N. & W. (probably
3-5 miles).

At Mission Hill
there is a low
elevation, or terrace?
Coming right into
view. This seems
to continue for a
mile or so to low
bluffs. (It's all the
same terrace)
Rolls back as
forward. It's all
there is to the bluffs.

Out of Yankton it
is rough for a little
distance, & then the
same broad plain
stretches out into
space.

At Springfield the
country gets rougher.

On train from Tyndall
to Springfield I met
Mr. Frazer, president
of the State Normal
(at Springfield)
whose wife was
a Reunion, sister
of Evanston & Luella.

From Springfield down
we could see the
high hills & knobs
along the Missouri
close to the river on
the S. side, & a
mile or two away on
our side, close to
the R.R.

Rocky cliffs also
on both sides.

At Running Water the
bluffs are close to
the river on the N.
side, rocky cliffs of
appearing above the
villages.

On the S. side the
rounded bluffs are
~~a little more remote~~
but the valley is
comparatively narrow

and is bordered by
high rounded hills,
which in places show
rock at the base.
Left for Verdigris
same evening.

1906
Aug. 18 - Sat. of
Verdigris is located
in the valley of the
Verdigris river, between
hills which rise on
the E. about 300 ft.
above the valley, &
on W. a little less.
On the E. the hills
are distinctly morainic
& gravelly soil appears
on the surface.
There are blocks &
boulders of conglomerate,
& smaller boulders &

pebbles of various types
(see photos of hills).
In the shelter of valleys,
& especially on the
west slopes & bluffs,
there are characteristic
brush oak groves.
Mr. Schmidt says that
20 yrs. ago there were
more stunted trees, but
since grass has been cleared
they have grown well.
The trees are chiefly
brush oak & a few ash
clump & low down
hickory. On bottom
boxelder, willows &
cottonwoods, plums, etc.
The Verdigris river
is narrow & swift,
2-8 ft. deep, with
gravelly bars where

any appear at all,
and they are few.
It has a narrow
channel.

The Misham has
a rather broad ^(about a mile) valley,
with the river hugging
the S. shore as far
as we could see.

The bluffs on S. side have
burial mounds in
characteristic fashion, - not
on top. The channel
is divided by bluffs
of considerable extent.

Mr. Schmidt says that
above Pishchikille the
valley narrows & the
river is near bluffs.
I found that in these
protected burial mounds
there was a fine black

soil from a few inches
to a foot or more deep,
with lower part showing
occasional gravel.

On the other hand the
top & slope toward S. &
W. had gravel at surface,
vegetation was thicker,
grasses, casts, etc.
Took two samples of
soil.

I also found in these
graves a number of
bone nails (recent).
The territory between
the Misham & Mission
& thence S. E. past
Nessige, is distinctly
savage.

Toward Pishchikille I
was told there were
formerly Indians.

219

sands on the hills, but
they are now overgrown,
Stops to see Mrs. Schmidt (Riesche)

Aug. 19 Sunday
Wrote, got wheel, etc.
J.H. Schmidt has a
son, Wm., who wants
to have about entrance
requirements to S.M.I.,
attends at Fremont.

A young man
is interested in the matter, but
get the name from R.S.

50

Aug 20 Mon.
Left for West Pt.
From Verdigris to beyond
Winnemucca country is
rough. Then a
plain until near
Norfolk (8.) hills
appear.

These come close to
the RR, a little below
Norfolk Jc. They
are rounded & flat-topped,
& not very high.
Down S. & W. a flat
plain.

The hills follow the RR
on E. side, within $\frac{1}{2}$ a mile ^{less} to
They are
decidedly morainic
in appearance.
The plain to S. & W.
stretches far out.

Occasional *Lin. cal.*
 groves (small) appear
 in the moraine
 toward Stanton. The
 hills come close to
 R.R. & south, across
 rather broad plain,
 hills appear.
 They are S. of the
 Eekhorn river.
 At Stanton the
 moraine bluffs are
 only 2 or 3 blocks
 from the deposit.
 Below Stanton &
 Eekhorn valley becomes
 narrower & the hills
 on E. & N. lower.
 Low hills also appear
 on S. side of valley.
 The hills toward Pilger
 become lower & more

about $\frac{1}{2}$ to $\frac{3}{4}$ of a mile back
 from R.R.

From Summit West Pt.

Down S. side of Elkhorn.

Found woody plants:

Amoeba	Sambucus villosa
Rosa chin	Cottonwood
Alnus	Bury Yew
Hackberry (variegata)	Minnesota Yellow
Wild Plum	Yellow Birch
Chokeberry	Salix discolor
Xanthoxylum	Amorpha fruticosa
Green Ash	Cephalanthus
Rosa blanda	Walnut
Rubus missouriensis	Lead Plant
Rhus radicans	Shepherdia
glabra	Crataegus mollis
Amelanchier	Prunus
Vitis	Blackberry
Hazel	Menispermum
Spiraea latifolia	Ry. Coffee bean
Cornus paniculata	
Symphoricarpos occidentalis	
Rubus occidentalis	

Cut 1 - Sec. 12 - High

cut, all in rather fine

drift, - yellow with blue masses & streaks in lower part.

Cut 2 A double layer

cut in Sec. 12.

It consists of drift all in cut 1, but is cut by 12 or more feet of

fine yellow loess, generally showing laminar even when broken, with

very few rounded nodules & some shell scattered

through especially toward lower part.

Cut 3- is a big one.
The top is from
yellow, friable
loam with some culture
nodules.

This rests on a red
joint clay - no
pebbles in sand
exposed, which
rises 65 ft. above
the low river plain.
The basal part is
obscured by talus.

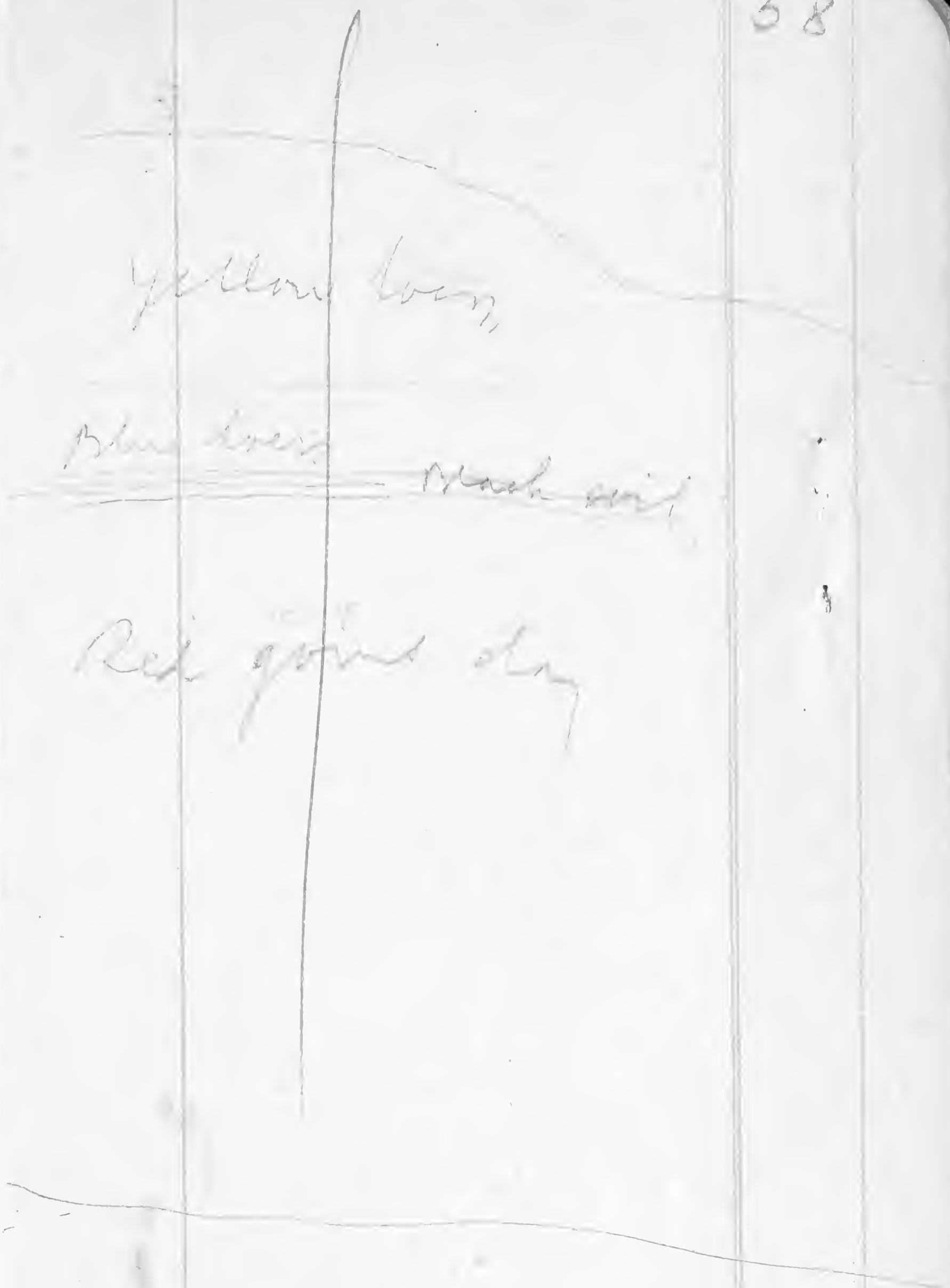
Between the loam &
joint clay there is
a dark band 2-3
ft. thick, with much
iron, which
looks like an old
mudstone.

Above it for about 2
ft. the stuff is stratified

then runs into what
appears to be a
blue loam with
very large iron nodules
the lowest loam is
blue & shades up
into other loam
some ft. above
the fossils & nodules
in the upper
light yellow loam.
I estimate the exposed
part of the loam at
40 ft.
The same on the hill says
in boring well they
went through 50 ft.
of clay & struck
joint sand.



The top of ridge here runs
 13.0 to 160 ft. above
 the river flat, (+15 ft
 in river)



Yellow loam
 Blue loam - Mack soil
 Red ground clay

Went on to look
at cut 2a in
new. ex. of sec. 7.
I think 3 is my old
cut.

At 2a. the river
runs up close to the
bluff & it is not
possible to get to it.

The terrain in sec. 1
(3 1/2) & 12 (a 1/2) certainly
looks mountainous. It
is full of deep
ravines & very narrow
ridges. sec.
S. & SW of 12 as far
as I could see, &
also S.E. except where
river bottom intervenes.
There seems to be a
rolling Kansan surface.

Aug. 21 - '06

E. along upper (N.) road
from West Pt., Neb.

Cut 1 - is N. of road & extends
into the 3rd hill from
Sklom bottoms going
S. It was made for
brick clay.
It shows essentially the
same strata as cut
3 below Meunier.

Less - light yellow
sand about 30 ft.

(1) no samples

See samples

(2) Black soil 5 or 6 ft.

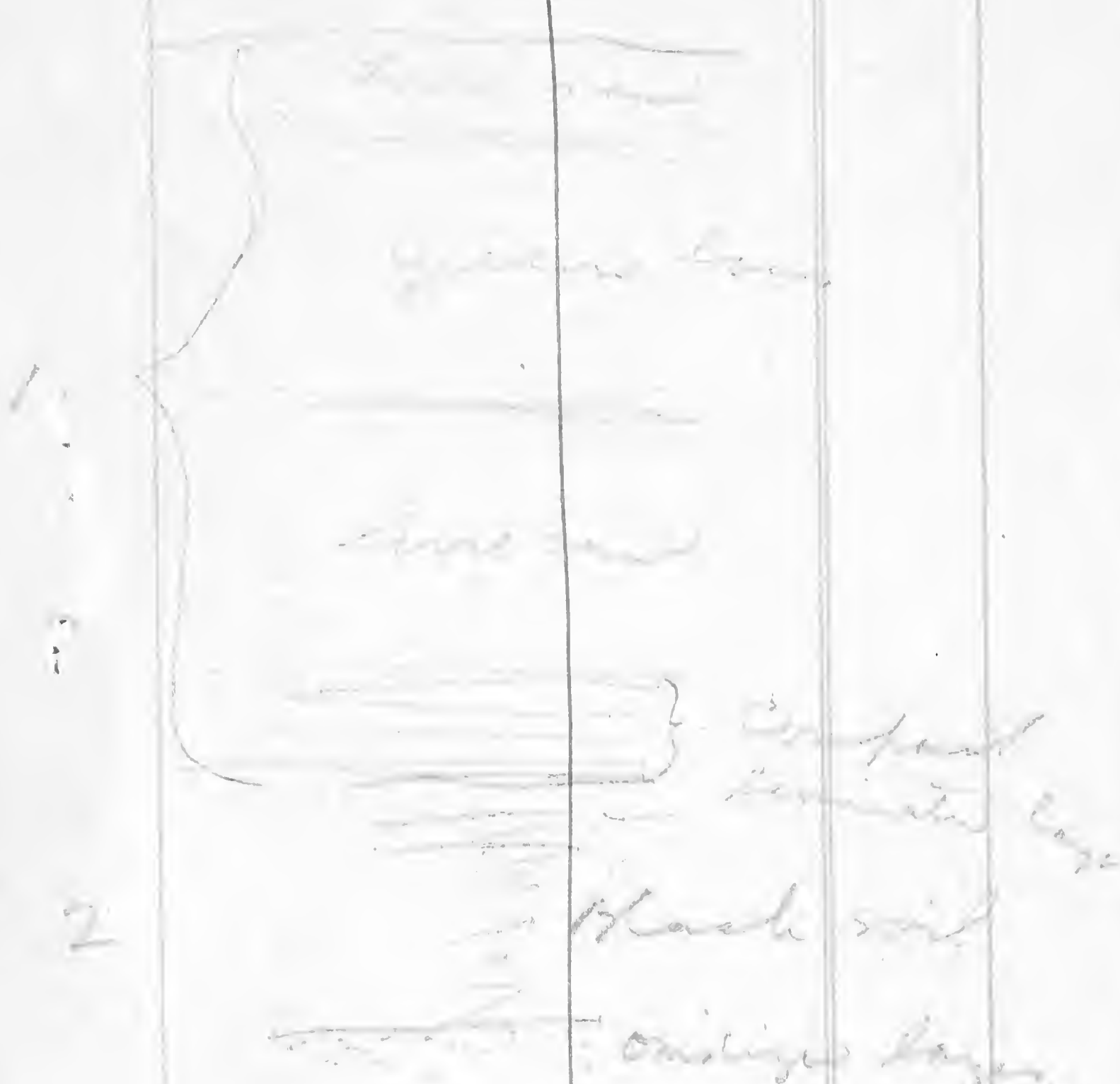
no samples yellowish, rusty

(3) joint clay (hard)
12 ft. exposed towards W. end
of hill, not exposed Eastward
because road runs with,

I could find no pebbles
in cut 2 & 3

The lower part of 1 (4 to
1/2 of it) is fine sand
which shows some laminations
parallel with surface.
There is also a layer
of fine sand above.
The lower part is
a heavy blackish brown
clay, that in cut
3 below Meunier, &
exposed at lower place
as sample shown here.
This has a lot of
iron in it (it is the
thin, fine layers)
and has a lot of
black laminations
(breaking into plates)
masses of iron (see sample)

no. 1 in cut 1



I found no fossils or
lime nodules here.

W. end of cut 1 - E. of road at

Look at 2000

plowed.

The soil band dips down (yours)

stratified layer about 10' at
N. end, it also shows soil.

E. of the town hall

Page no. rec: 35

as far as I could see
the country was barren
topography, & the
impression says there is no
sand, but a yellow clay
soil (loess).

1855, 455 on higher
 ground than the
 sitting ground. Both
 were in the E. of the
 as the eye could reach.

They are as high as
the highest points out
and 3 the below Beacon.
The ridges run about
straight N. here &
the western says they
run a stretch of
miles or two wide to
Storobut on E side of them.

Level of defect 185A

425 213

()

2000

13

132

1

13

3



1

1997

52

15

1

Yours
L. Q.

11025

702

04C

775 92

77 208

1

20



and coming to W.
 I was at the
 they were as far
 as he has run
 to hold co.

Cut 4 on hill 5. Shows
 some sand near top but
 on W. side where cut
 no deep loose sand
 at top. ~~The sand~~

~~part of the hill~~
~~is sand.~~

Hill 5 is the highest.
 Next comes hill 4, then
 3, then 2, then 1.
 The whole ridge finally
 has a sand-dune
 aspect.

The section shows during
 dry seasons & in
 spring before grass

gets growth the sand
 shifts a great deal.

The barometer at top of
 hill 5 registers 95
 ft. higher than hill
 at cut 3, - meaning, how
 no change took place
 since yesterday.
 The level about then
 about same.

All elevations were
 taken on vertical surface
 of sand being cut &
 filled.

Hills 5 & 4 covered by
 a low ridge a little
 5 ft. high.

Cut 4 is essentially like
 cut 5.

cut 3 shows sand on
 W. side, but 4 to 6 is
 from below, at least
 back of deep, with
 its lower part
 containing nodules.
 The section says the
 sand along the top
 of ridge (a little
 W. of N.) & that
 no digging graves he
 doesn't strike any
 nodules. Layer. It
 is evidently lower.

The 320 ft is now cut
 1, & is about on a
 level with the top
 of the black soil
 layer.

The slope to the E. shows
 a very loose (like in cut 1)

A terrace or foot hill
 on which school stands
 seems to be made up of
 sand joint clay like
 no. 3 in pit, but more
 sand. It is very hard.

Aug 22 1906

Dig from Scribner to
 Clarkson.

From Scribner (after
 leaving river bottom)
 the surface is a
 gently rolling terrace.
 This extends to Dodge
 where hills become
 more prominent.

Along wagon road E. of
 RR., about 2 miles

8. 2. Fossils, is
an exposure of
bluish loess, with
many small nodules
(see examples).

Fossils are found
scattered all through
nearly to top of
loess.

Cut is only about
4 ft. deep.

The cut is continued along
R.R. north of road &
becomes 12 ft deep.
10 ft. of yellow loess

striated & mottled with
blue, in exposed part
is loess.

Some nodules are very
plentiful & some
larger clumps.
Rounded & 1/2 to 1 inch.

cut 6

The big cut 3 mi.

E. of Clarkton

Shows on N. side E
cut about 18-20

ft of yellow loess
with blue streaks
below & the lower
half is gray.

Fossils are also
the same as in
earlier from loess.

On south side
at E. end the cut
is only about 12 ft
deep, & 2 ft of blue
loess with large
iron tubes &

fossils is exposed
at base. The
rest is yellow
loess (like the N. side)

with many nodules
 & some fossils
 Lime nodules are
 very plentiful in
 this upper part.

E. and S. side

Soil 2 ft

yellow loam

8 ft. of ... nodules &
 some fossils

Blue loam 2 ft

~~XXXX~~

The light grey part of the
 lower part of the
 is the yellow
 loam & the are rather
 all over.

Aug 24 1906

Big dump - cut me /

Barometer on bench
in dump cut read
465 ft. It had
been set to 400 at
West Pit.

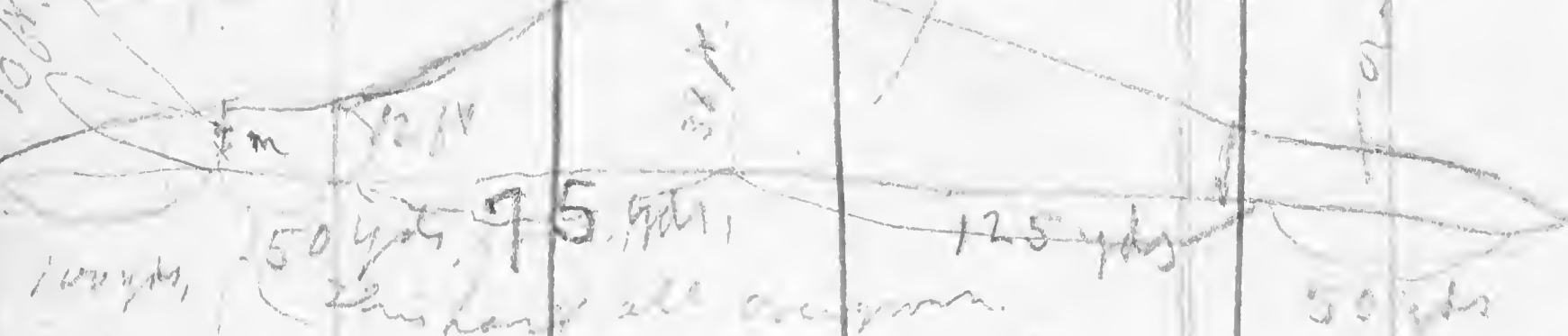
a is a yellow loam zone
with about a foot of
black soil. It follows
the vertical contour &
weathers easily.

Cut is over 400 yds
long. It is but just

is
samples
are

(S. side) zone

orange



side
numerous dells
Aug 22, 1906

at the collection
material Aug 22 of
the W. side the
cut is history very poor

6
cut B.

1X Sample of blue loam 5' wide
taken Aug 22 - across
broken shell.

W.

7-8 ft. of soil - loose yellow loam

Yellow loam 6 to 8 ft.

Yellow loam

Sample of clay, 1' thick x, x, x.

200 yds.

yellow loam
yellow loam

E.

~~taniform yellow~~

~~leaves~~

~~see May 26~~

~~1706~~

~~1881~~

6.

~~In W. side cut to run like this~~

~~postman W. side all original with grass~~

38

8. The blue loam is compact, blue, not laminated & with very numerous & quite large iron tubercles also many fine nodules which seem to be more abundant in the yellow loam towards end of cut. The line between ^{reddish} yellow & blue loam is not sharp nor is that between the blue loam & the brown yellow. - Though in a few spots I found an iron streak in the latter.

Sample of c (lower yellow
 layer taken from middle
 about 5 ft. above kk.
 A few very small
 fossils were found in
 this. There are very
 few, if any, lim
 nodules in the lower
 yellow layer.
 A little below
 junction with blue
 layer, & for some
 distance down,
 blue clay ro
 cylinders (like
Gambusia) are
 abundant.
 In the blue layer
iron tubes are very
 abundant & especially
 in lower part.
Reptiles they are

rather abruptly. at
a, but the line is
 not very sharp.
a is more compact
 & with bluish ro
 streaks in the lower
 2 ft. The whole
 layer is 7 or 8 ft
 deep.
 The blue layer runs
 about 6-9 ft.
 Sample from a taken
 6 ft. from top.
 Sample from b taken
 3 ft. above base
 No fossils in a &
 very few in upper
 part of b.

The blue loess has
some fossils, but
the yellow loess has
none & they are
scattered all through
part W. of high point
in cut for 50 yds
there is a thicker
part of blue loess.

The loess in the N.
side towards E. end,
where I collected
fossils Aug. 22, has
streaks & bands of
blue loess in it
rather low down, & the
upper part is yellow,
quite fossiliferous &
with many nodules.

From cut 5 to cut 6
is about 500 yds.
Cut 5 is about
~~200~~ 250 yds long &
12 or 14 ft deep.
It shows very many
nodules, a few
shells, & loess with
blue bands & streaks
on a smaller scale
somewhat similar to
cut 5 & 6

The upper yellow loess
which is only about 2
ft deep & the line
is quite distinct.
The blue band is
3 or 4 ft. deep & occurs
above the yellow loess.

below which blue
not cylinders in
blue clay.
The blue layer
has great
amount of lime
nodules. They
are very numerous.

Cut 2 5.

yellow clay 1 mi.
Blue clay 14 ft.

yellow clay

200 yds.

The shale now to be
chiefly of red shales
in lower yellow loam
the blue loam remains
& drops westward.

5

4. From cut 2 to cut
X is about 150 yds.

Cut X⁴ is 150 yds beyond
road S.W. ↙ ↘

The top of hill at cut 3
is 120 ft. above
plain at Clarksville

Spent night at
Harden House in
Scribner.

1906.

Aug. 25-

Left at 8 am. for
 Fremont & Blair.
 The bluffs abutting
 valley between Scribner
 & Horner, on S. side,
 are low, & abrupt

as if whipped up.
 Nearer Horner they
 become higher &
 more rounded.

There are areas
 (in single places) covered
 only with low sand.
 This would act like
 Symphonica.

There ^{low} bluffs, with
 sand everywhere in
 evidence, extend

to near Nicholson, where
 they roll back &
 flatten out.

From beyond Arlington
 to Blair the country
 is strongly rolling
 Kansan.

The first big cut beyond
 Arlington, & within
 about two miles, ~~Kennard~~
 shows lower
 blue loam (thick) separated
 from upper yellow
 by a narrow brown
 band which follows
 contour.

There seem to be
 brick & tile works at
 Kennard.

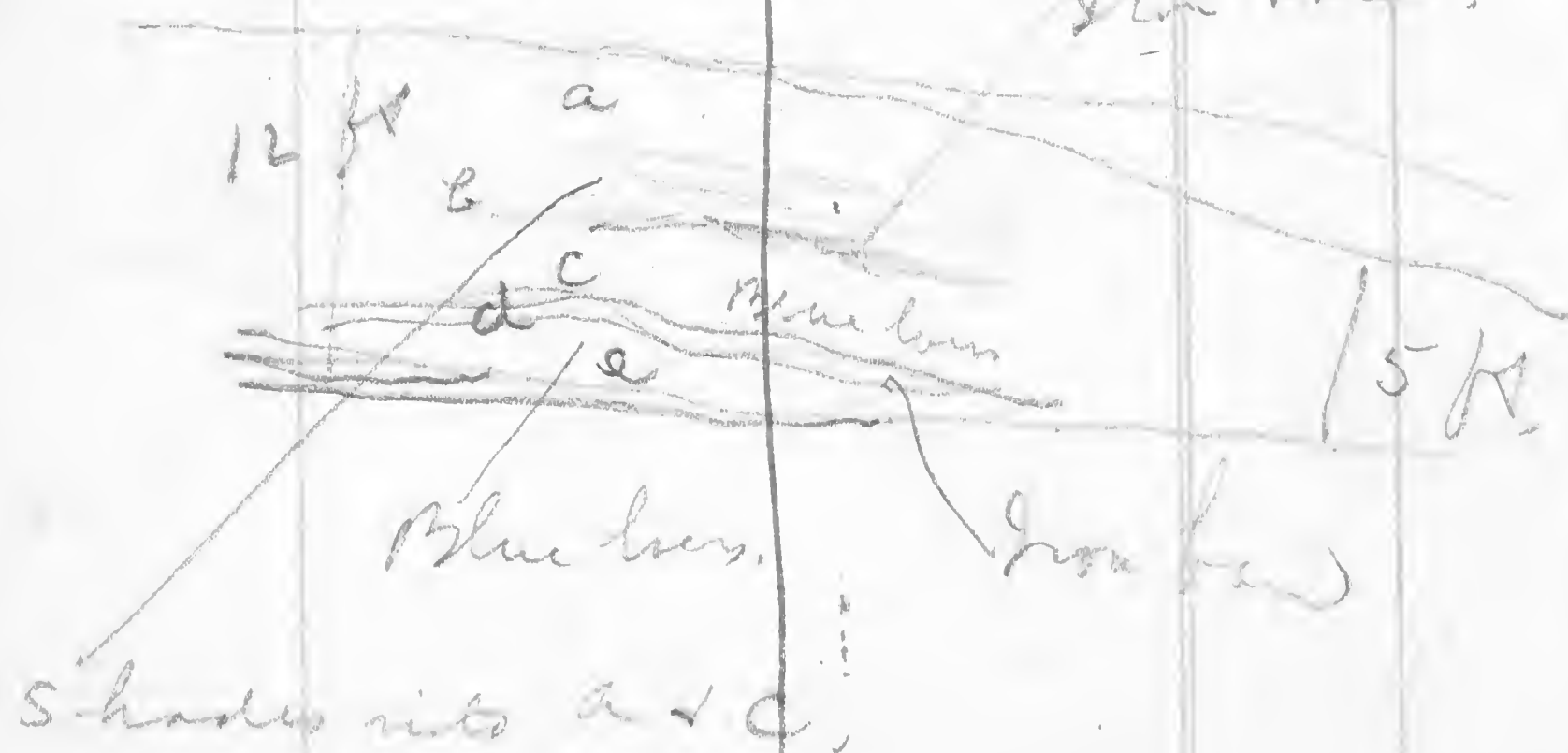
5 Blair, Feb Aug. 25 '06
 Cut 1, or cut W. of Blair on
 corner. (Drempel brand)

The cut is overgrown
 & does not show much,

but what I am
 designating as cut 1 is
 just inside the fence,
 back of the Blair

Town Hall, just outside
 of the city limits, &
 back of the first
 cut on RR.

5
 Cut 2
 Cut X is as follows at
 N. end Iron band.

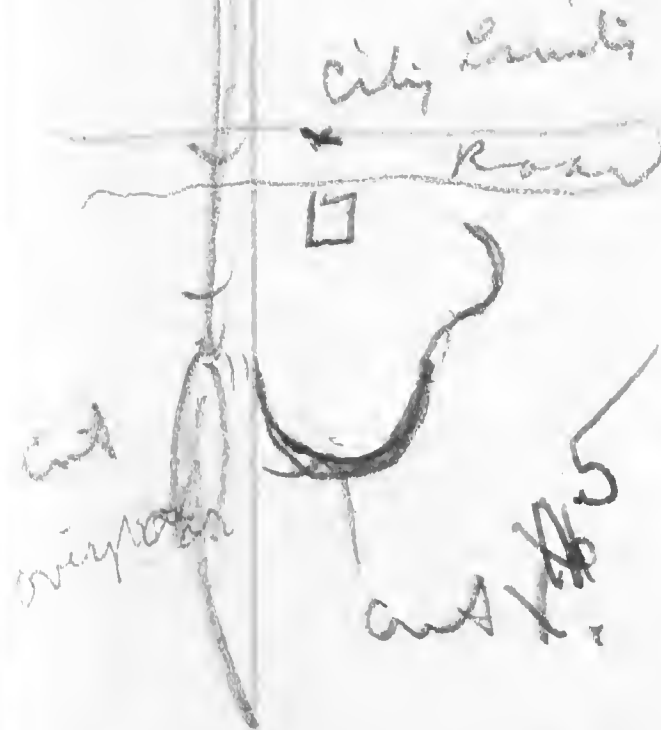


D. D. D.

a shades upward
 into black soil. It
 feels more like first
 clay. It has a few
 pebbles, (see sample)
 b. is intermediate, lighter
 than a, & with iron tubercles.
 c. is blue loess with
 iron bands in some
 places, but in
 part, only shading
 up into b.

d = iron band.

e = blue loess with
 tubercles (large)
 & farther S. it
 contains many lime
 nodules.



a = 4-6 ft

b = 1-2 ft

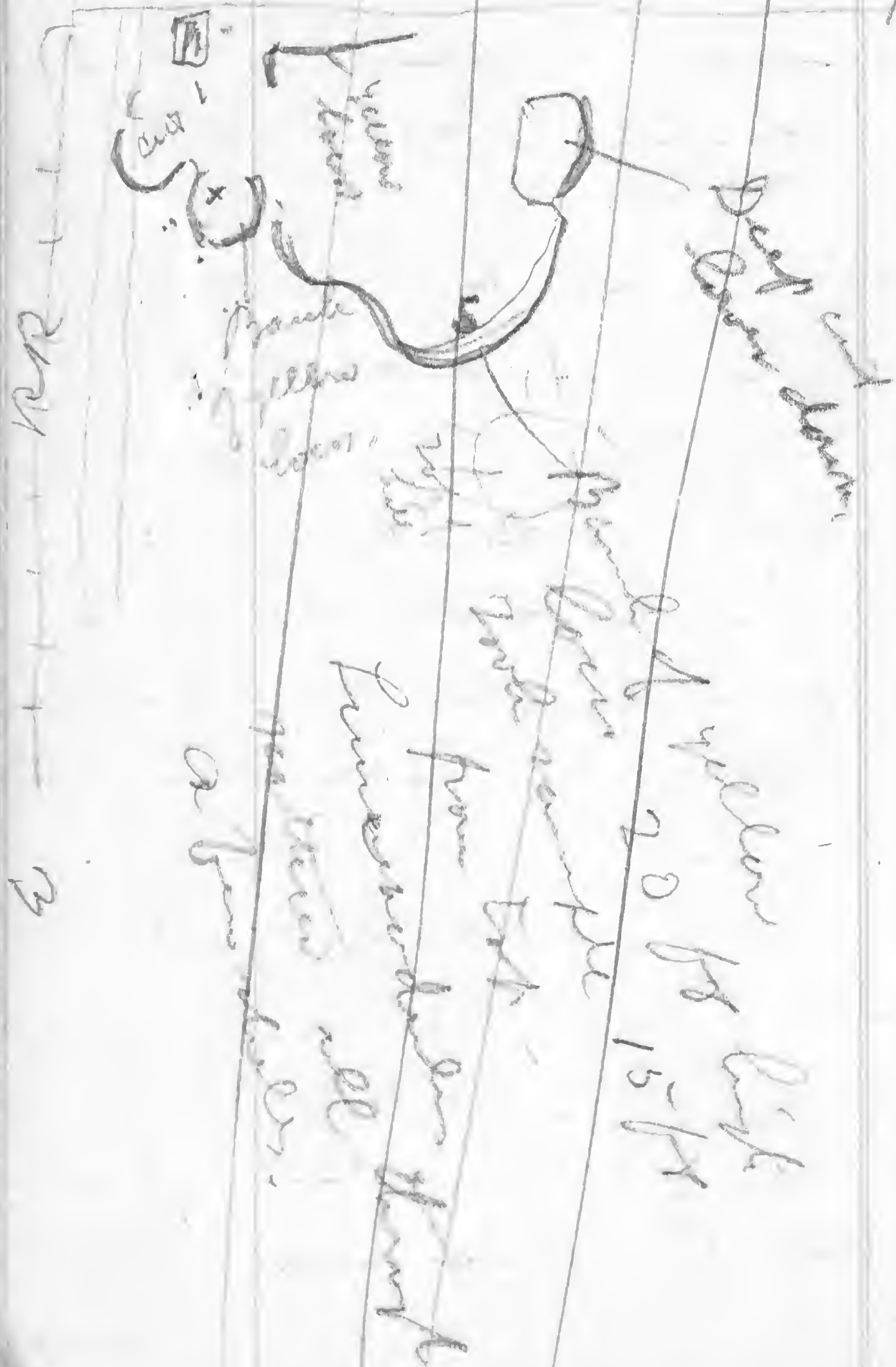
c = about 3 ft

d = 2-6 in

e = 1-2 ft exposed.

No shells were found
in this part.
Samples of a, b & c
were taken.

Plain
road
D. M. Chapman



In the other parts of cut
1 there is yellow loam,
thick toward top of
hill, streaked horizontally
with blue loam,
nodules scattered through
& shells few & scattered.

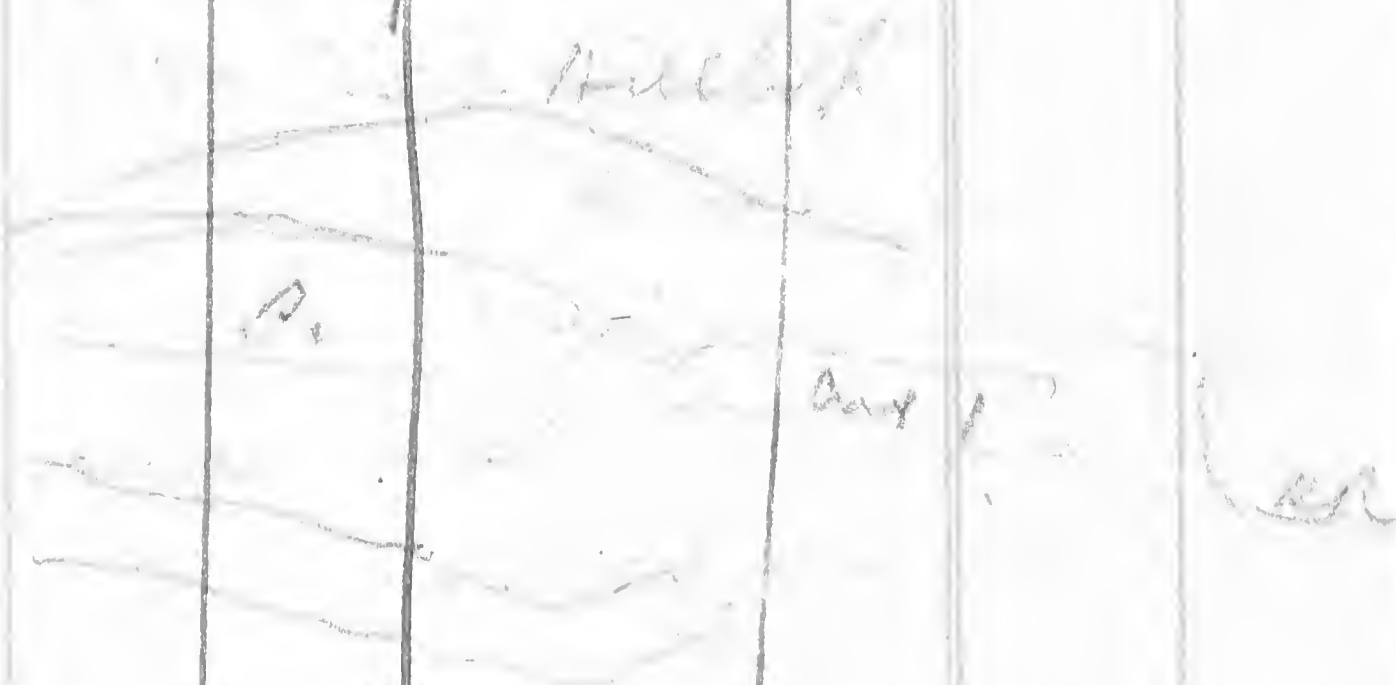
At x no. a of cut 1
Thin out & soon
disappears, & yellow
loam & soil with
small nodules in
upper part of former
appears at top.

(A) has yellow in it
only toward lower
end of cut.
Photos 27 & 28 show
cut & animal bands

The yellow loess shows
 laminations when
 broken.
 The blue loess
 scarcely shows it.

The hill rises only
 about 75 ft. above
 top of high loess bank
 at S.

The hill top is scarcely
 more than 60 ft. above
 the R.R.



Brick is made from
 the thick yellow loess,
 chiefly from S.

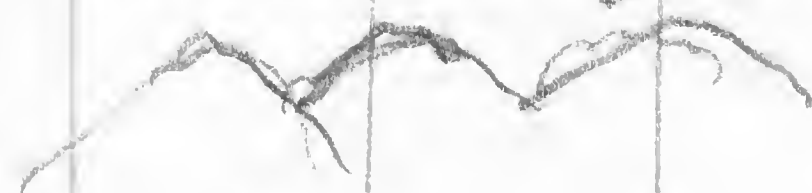
Blair to Florence & back

Below Blair the
 hills are pointed, &
 the points tip toward
 valley.



This is frequent.
 3 or 4 mi. down there
 is a big vertical wall
 of loess next to RR. -
 a cut.

Below this are rounded
 knobs after another



Then road cuts
 away from bluffs
 before S. S. is reached.

The hills from Plain
to below De Sota are
pretty well timbered
especially southern.
The timber is
chiefly ~~brown~~ ^{oak} ~~oak~~
& often hills rise
above it.

Some distance below
De Sota (before reaching
Calhoun) we cut
into the hills - have
quite low, but
showing timber to west.
Yellow loess shows in
cuts - not very
deep.

Calhoun is on gentle
swelling foot hill &
low bluffs appear
in town & at edge.
They are rounded hills.

but these are not
the river bluffs.

There seems to be a
good deal of timber
in valleys toward
river & also to right
of RR.
We seem to be
traveling on a
sort of bench, with
highly hills to right
near Coffman we
run in among
big hills, & continue
so to frame.

Trees between
 Coffman & T. m. m.
 Cottonwood Salix discolor
 Gummy wild plum
 Red elm Salix longifolia
 Elm
 Coturniculus mollis
 Am. elm.
 Birch
 Hazel
 Box elder
 Walnut
 Crab.
 Amphelopsis
 Cornus canadensis
 Wild grape.
 Green ash?
 Ribes m. m.
 Wild Cherry
 Choke cherry?
 Salix amygdaloides?
 Sambucus racemosa

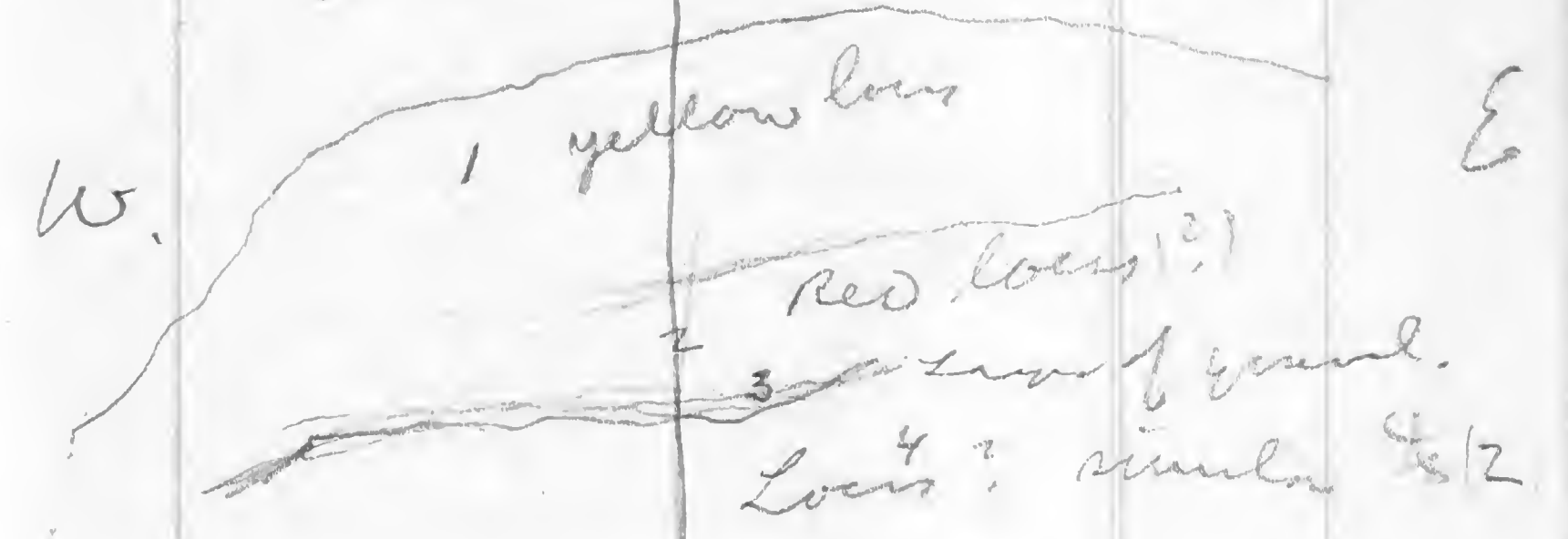
Co. Bluffs & Glenora

Aug. 28-1906

Left Co. Bluffs at 10 AM
 Took picture of wind hills
 looking S.E., where intersection
 of roads in sec. 33
 Lewis Twp., Polk co.
 Went N.W. road about 1/2
 mi.

A gulley is here and
 in hill to right (E.) of
 road. It shows

following



See samples of 1, 2, & 4.
 (3) contains many dark
 pebbles, mostly worn &
 bedded. It runs to
 dis appear to right

10 is the ordinary
loam & contains a
few fossils & a
few rounded nodules.
I also found 1 *Succ.*
gromeri (recent) on
bank (1).

The lines between 1 & 2
& 2 & 3 & 3 & 4 are
quite (very) sharp.
1 & 4 do not show
lamination.

2) shows in but oblique
as if due to clippage.
The gravelly layer is
oblique & runs from
8 to about 12 or 14 ft
above road, which is
about 15 or 16 ft
above gravel bottom.
It may have been
washed from a core

above, or may be an
old beach.

No. 2 is 10/12 ft. exposed
& several ft. of 4 at
base.

(3) is 2 to 8 in wide.

1 shows about 10 ft
but evidently is

thinner above.

At the road the gravelly
layer is about 2 ft. to
4 ft. above road.

(3)

— A little farther up the
road, a bank by road
shows about 12 ft of
yellow loam - only.
Except about 2 ft. of
red soil at SW end at
very base.

The next cut toward
cross-roads (840) shows
gravelly layer about
12 ft. above road
also red & yellow loam.
This is nearly E. way back
to cross-roads.

A 3rd cut, near cross-roads
shows little but
yellow loam. Observed
by slips.

Going S. from cross-roads
the 1st exp. near summit
shows narrow belt of
gravel. The 2nd
much larger. Shows
a layer several
ft. thick. The 3rd
some gravel - its
thickness.

A couple of cuts S of
co. line in hills is
show gravel.

In the exposure at cross-roads
1 mi. S. of co. line, on
E. side of road, about
10 feet of drift shown,
with gravel all through
& lower half lighter
bluish joint clay
with sand & some gravel.
Some of the boulders
along these bluffs
measure 4 or 5 in in

diam., & are angular.
The topography all along
here is "wind table".
Near N. line of sec. 17
the hills are even
more abrupt at road
& covered from a low
with scrub brush &
sagebrush, etc.

At the exposure in
sec. 17, 2 1/2 mi. S of

Co. line the drift
shows plainly in
a number of cuts
there are here a
few very large
boulders, mostly red.
The drift rises at
least 35 or 40 ft
above the bottom,
25 or 30 ft above
the road. Red loess
also shown in
many places, &
all encased with
yellow loess.

The drift is irregular
7 or 8 ft high

Loess

Drift

On all these hills
"cat's paws" are common

Loess -

X

Drift

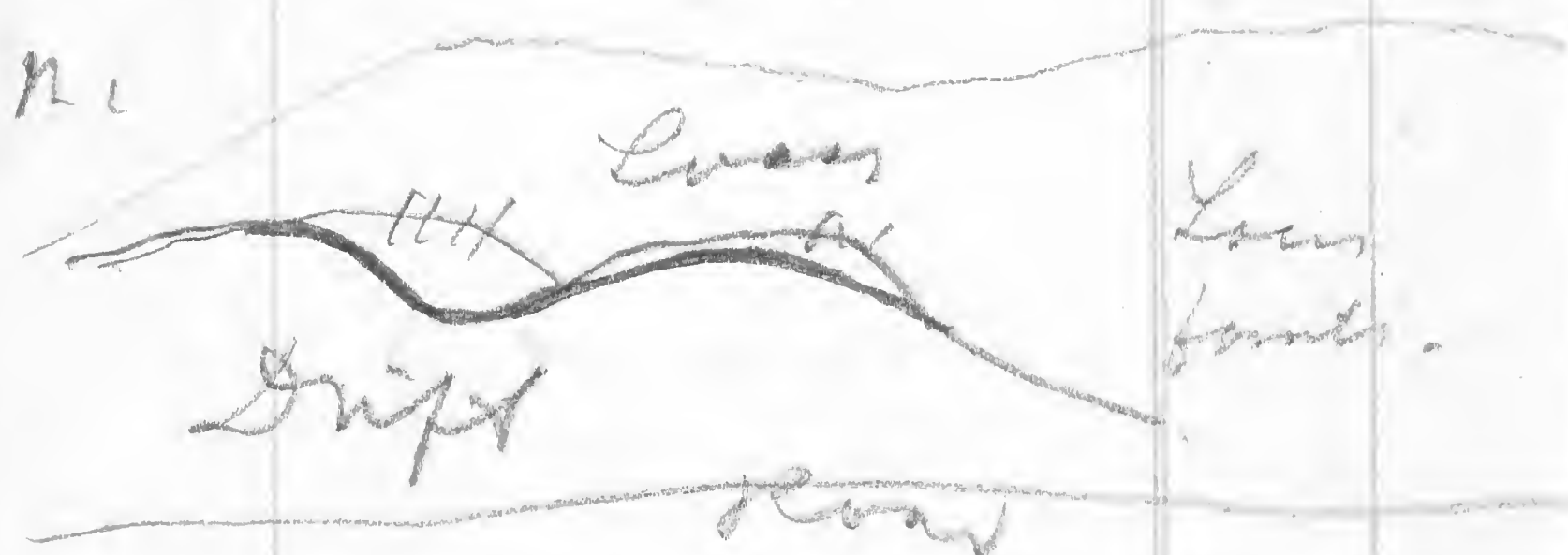
Road

Fossils very abundant
& extend up at least
18 ft.

Cross road 2 1/2 mi S.
of Colton.

This loess is in places like
brown soil, a little darker
than usual loess, but
above it is compact &
shows shells. The shells

shade out above &
 low brown drif
 & yellow. at
 18 ft above road
 there are still shells
 Big masses are
 about lost.



Rock shown in exposure
 between next cross road
 was reworked.

Cut of telegraph pole east of
 N. of Hinton, Mills co.

6 ft. Lown a

3 to 6 ft. b

8 in to 2 ft. d

Drift

Drift Large boulders
 (a few)

a = yellow loam, with
 abundance of fossils
 + lowest 6 or 8 in very
 hard with iron - &
 containing shells throughout
 in both parts.

b. Is a bluish joint clay

c. Has lots of iron. Between
 it & b there are some nodules

Plates - horizontal.

The Minomi here comes close to bluffs.

On opposite side are sand bars (extensive) & clouds of dust & sand were continually swept along. It was a windy day & the valley was full of dust.

Off. Pacific & beyond drift shows abundantly in some places large boulders.

~~Drift~~ Dark reddish clay
chocolate joint clay
blue joint clay

Drift

blue joint clay
in one place.

Bluff just beyond Pacific City is about 40 ft high & seems to be all yellow loess with a few fragments of shells. In lower part the loess is lined & laminated with iron. It also contains nodules. There seems to be here, as elsewhere toward Glenwood, a redder tint to the uppermost several feet (2-5) of loess.

About $\frac{1}{2}$ way up the Glenwood hill (from Pacific City), on the W. side, I collected a small box of shells. They were in yellow loess, -

this being like yellow
loess generally in this
part, quite light yellow,
with iron & bluish
horizontal streaks, and
a very few nodules.

At this point about
7 ft. were exposed.
All along the road
there is a cut from
3 to 8 ft. deep, the
road here ascending
a hill fully a mile
long. I noticed
scattered shells &
fragments (*Unionia*)
nearly to the top
of the hill.

In all the territory
S. of about a mile
S. of Mills co. N. line

there seems to be
a considerable amount
of scrubby timber, - brush,
sumach, *Symphoricarpos*,
Ammophla fruticosa (low down)
etc. etc.

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110

111

1906

Expenses - Geo. L. Sur

Voucher

Aug. 3 -

4301 - Express, barometers \$.60

Aug. 8

R.R. fare to Des Moines 3.64

Subsistence, " " .75

Drayage " " .25

R.R. fare to Sioux City 5.78

Aug. 9.

Subsistence, en route .50

" , Sioux City .50

Small file¹⁰, pliers²⁵ .35

Drayage - Sioux Cy. .30

R.R. fare to Ponca 1.00

Aug. 11.

Hotel (Commercial) Ponca $1\frac{3}{4}$ day 3.50

R.R. fare to Sioux City 1.00

Drayage " " .30

Boxes + basket " " .45

Lunch " " .45

R.R. fare to Westfield, Ia. .83

Aug. 12

Lunch in country .25

112
20.45

Aug. 13.

Livery + dray - Westfield \$ 3.00

West Hotel " 2 hrs. 2.00

R.R. fare to Sioux Falls 1.91

Lunch, Canton. .30

Transfer baggage, Sioux Falls. .25

R.R. fare to Pipestone 1.25

Aug. 14

Hotel, Pipestone, ^{Calumet} 1 day 1.50

R.R. fare to Laverne .80

Transfer at Laverne. .25

Aug. 15

Hotel Manita " 1 day 1.00

R.R. fare to Sioux Falls .90

Lunch - Sioux Falls. .35

R.R. fare to Beaver creek .65

Lunch at " " .25

R.R. fare to Sioux Falls. .65

Lunch " " .35

R.R. fare to Canton .55

Aug. 16

Room at " .50

Lunch " " .25

R.R. fare to Sioux Falls .55

Lunch .35

20.86

113

5-38.06

Aug. 17-

Hotel Teton, Sioux Falls, S.D. 1.00

RR fare to Hankston 1.85

Lunch " .40

Basket " .10

Transfer " 25

RR fare to Runningwater 1.38

Transfer to Victoria 50

RR fare to Verdugo, Cal. 35

Aug. 18,

Livery - McNeil, Verdugo 1.50

Expenses on bicycle 2.00

Lunch 25

Aug. 19

Hotel (Mrs. Schmitt) 1 day 1.50

Lunch 25

RR fare to West Pt. 2.75

Drayage (bike) 25

Aug. 20

Lunch, West Pt. 25

Aug. 22

Hotel (Helip) 1 1/2 days 3.00

\$ 55.84

114

55.84.

RR fare to Scribner .37

Drayage (bike) 10 .25

Dinner - Dodge, Neb. 25

Lunch - Howell, Neb. 25

Aug. 24 - Hotel (Nob. Hotel)

Clarkson, Neb.

RR fare to Scribner, Neb. 85

Drayage (bike) (to Omaha) .35

Aug. 25 - Hotel (Hansen Home) 1.00

RR fare Scribner to Blair 1.45

Lunch - Blair 40

RR fare to Council Bluffs 1.25

Aug. 26 -

Hotel (Kiel) Co. Bluffs 1.00

Car fare .20

Aug. 28 - 2 Lunches Co. Bluffs .50

" 29 - Commercial Home (sup. 2000) 1.50

7.66

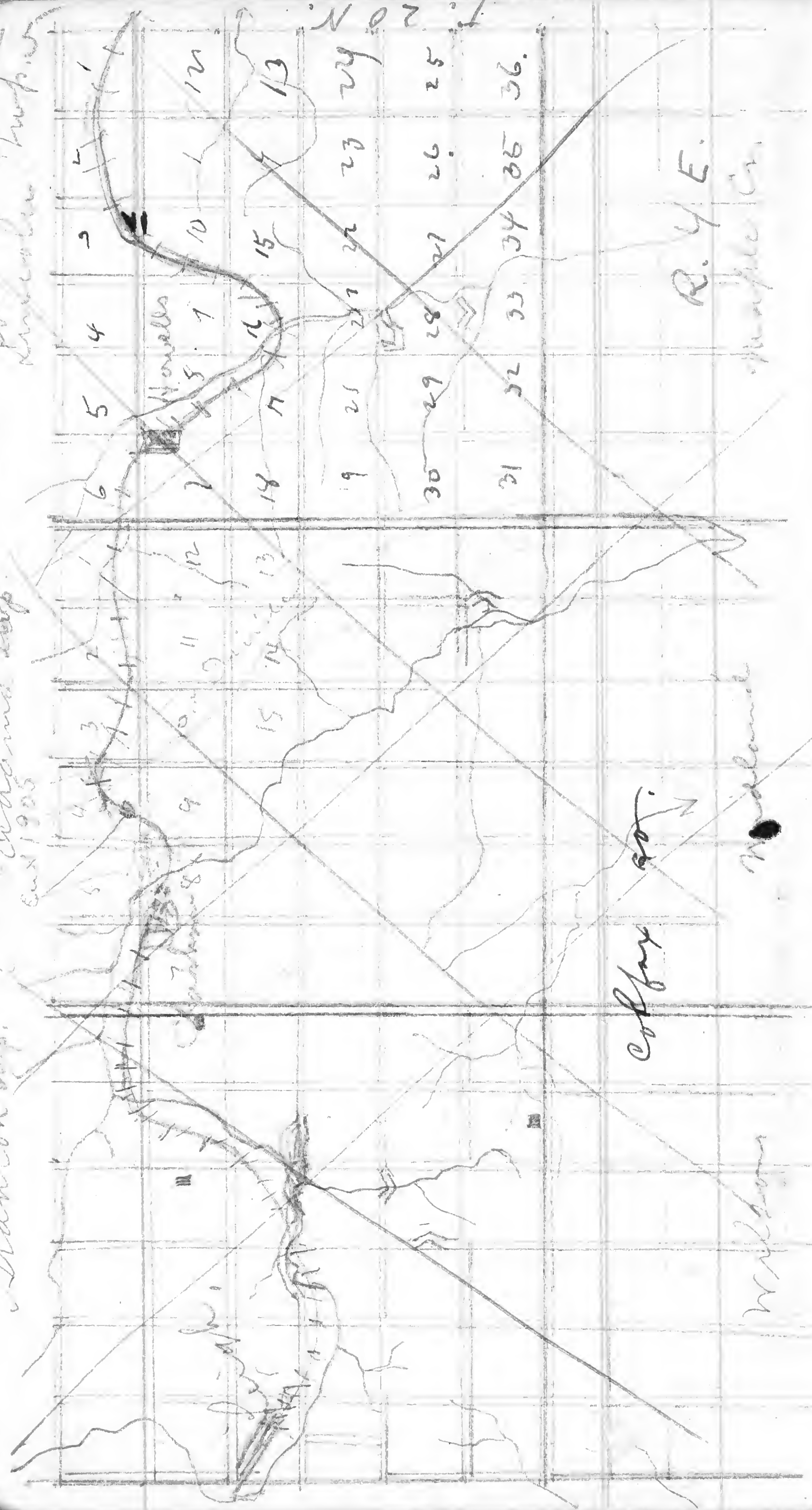
55.84

65.46

Stanton Sup.

Stanton sup.
Chadama Sup.
Aug 1905

Cunning sup.
Hawalee Trup. 5



R. Y. E.
Maple Cr.

W. 1

5
last month
very much

6

4.
and 1905



see 4 5

119

N



118



Photo List St. John

Aug. 21, 1906

- ✓ 5. View of dunes area looking N. from top of hill 5.
- ✓ 6. Dunes area S. from top of hill 4 from summit of same etc. in distance valley.

Packed at Verdigris

in box 3

Beginning at top -

- 28
- 27
- XX
- X
- B
- A
- 32
- 31
- V
- U
- n
- m
- 22
- 21

} n.g. spoiled
 } n.g. "

April

25

121

Photos

Aug. 15¹⁹⁰⁶ - Mountain, looking across
Big Sioux valley, to Penitence
Sioux Falls.

20 - Looking down Big Sioux valley

21 - A quiet patch in the
Big Sioux - north of So. D.

Aug. 16-1906 22 - Cut 1 (1/2 in back view
on N. side) along Ill.
Cent. W. of Sioux Falls.

31 - Camp of Sioux falls.

32 - " " " "

Aug. 18-1906 33 - View from moraine hill
300 ft. above Verdigris.

34 - S.E. along moraine

35 - View of moraine S.
also Corviah gorge.

Aug. 18-1906 36 -

37 -

38 -

39 -

40 -

41 -

42 -

43 -

44 -

45 -

46 -

47 -

48 -

49 -

50 -

